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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/912,306	07/26/2001	Takahiro Naka	107439-00049	8068

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EXAMINER

DUONG, THANH P

ART UNIT	PAPER NUMBER
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1764

DATE MAILED: 08/10/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/912,306

Applicant(s)

NAKA ET AL.

Examiner

Tom P. Duong

Art Unit

1764

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 May 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 4 and 10-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 4 and 10-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____

DETAILED ACTION

Responsive to the request for reconsideration, the prosecution has been reviewed. The office action mailed March 11, 2005 was inadvertently made final and according is withdrawn and the statutory period set therein vacated. The amended claim 4 necessitates new grounds of rejection.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. Claims 4 and 13-20 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Lovercheck (4,424,771) in view of Negishi (6,165,633) and Marion (4,394,137). Regarding claim 4, Lovercheck discloses an apparatus (Fig. 2) for feeding a fuel (methanol, Col. 5, lines 3-4) to a reforming apparatus (30) that generates a hydrogen-rich gas (Col. 7, lines 10-13) by reacting water, methanol and air (Col. 12, lines 57-60) on a catalyst (Col. 4, lines 3-6), comprising: a first methanol tank (3) wherein the methanol is controlled to a predetermined value for use in reforming, a second (44) fuel tank wherein the gasoline fed is controlled by selector switch (48), and a switching means (48) that switches the first and second fuel tanks used as a fuel source according to the conditions of operation of the methanol reforming apparatus; an evaporator (8) that generates a

mixed fuel by evaporating the mixed fuel solution supplied from the first or second mixed fuel solution tank. Lovercheck discloses the use of alcohol fuel such as liquid methanol (1st tank) or gasoline (2nd tank) (Col. 7, lines 15-17) but does not disclose the use of mixed water-methanol; however, it would have been prima facie obviousness to feed commercially available, alternate fuel source such as gasoline, propane, and/or methanol, and etc. to the reformer to generate hydrogen-rich gas (See USPN 4,282,835, USPN 5,648,182, and 4,946,667) other than the use of mixed-methanol solution. Note, inclusion of material or article worked upon by a structure being claimed does not impart patentability to the claims. See *In re Young*, 75 F.2d 966, 25USPQ 69 (CCPA 1935) and *In re Otto*, 312 F.2d 937, 136 USPQ 458, 459 (CCPA 1963)), and *Ex Parte Thibault*, 164 USPQ 666, 667 (Bd. App. 1969). Lovercheck fails to disclose an electronic control unit that controls the switching means so as to supply the mixed fuel solution from the second mixed water-methanol solution tank to the evaporator when starting and/or stopping the methanol reforming apparatus. Negishi teaches the electronic control unit 50 is used to control proper amount of supply material from tanks 28 and 30 to the evaporator (24) to facilitate the reforming reaction in the reformer 22 (Col. 13, lines 40-60 and Col. 17, lines 25-55). Likewise, Marion also teaches the use of a control means 40 (Fig. 1 and Col. 24, lines 6-37) to control proper amount of fuels to the gas generator and to allow different types of fuel to be used in the reforming process (Col. 1, lines 54-65). Thus, it would have been obvious in view of Negishi and/or Marion to one having ordinary skill in the art to modify the reforming apparatus of Lovercheck with control means as taught by Negishi and/or Marion to regulate proper amount of

each fuel to be feed the reformer and to allow more than one fuel to be used in the reforming process. Regarding claim 13, Marion discloses the electronic control unit (40) with oxygen/ carbon ratio and water/fuel ratio of the claimed invention. In addition, it would have been obvious to one having ordinary skill in the art to optimize the ratio to the feed materials to provide proper fuel, air, and water ratio thru routine experimentation. (See *In re Boesh* and *In re Aller* for optimization of ranges and result-effective variables). Regarding claim 14, Negishi discloses the control unit for the mixed fuels and further discloses the air supply to the reformer (Fig. 1 and Col. 24, lines 13-24) to control the temperature in the reformer, and Marion also discloses the control unit for the mixed fuels and further discloses the air supply to the reformer to maintain the temperature in the reformer (Fig. 1 and Col. 17, lines 1-9). Thus, it would have been obvious in view of Negishi and/or Marion to one having ordinary skill in the art to modify the apparatus of Lovercheck with control unit to control the amount of fuels and air supply. Regarding claim 15, Marion shows O₂ sensor (flow transmitter 67 and 71) and fuel transmitter 48 and 58 to provide proper fuel and oxygen ratio. Regarding claims 16 and 17, it appears the mixing of fuel and oxygen in the apparatus of Marion during start-up and/or normal operation provides the same performance as the pre-mixed batch of the water-methanol of the claimed invention since both Marion and the claimed invention provide a balance feed of fuel and oxygen ratio to the reformer. As such, the pre-mix fuel batch of the claimed invention versus simultaneously mixing of fuel and air at start-up of Marion appears to be an obvious matter of design choice in view of the absence of unexpected results. Regarding claims 18-20, Lovercheck fails to show an

electronic control unit and a temperature sensor installed inside of the catalyst. Negishi teaches a control unit 50 with temperature sensor 31, which detects the internal temperature of the reformer 22 and adjusts the amount of supplied oxygen to the reformer for proper temperature control. Thus, it would have been obvious in view of Negishi to one having ordinary skill in the art to modify the reforming apparatus of Lovercheck with an electronic control unit and a temperature sensor as taught by Negishi in order to provide proper temperature control in the reformer. Note, different mechanism of controlling the air and/or fuel (water/methanol) to obtain a certain concentration, molar ratio, and temperature in the catalyst is considered to be intended use, and intended use and/or manner of operation of the claimed apparatus does not distinguish over the prior art apparatus. See *Ex parte Masham*, 2 USPQ2d 1647 (Bd. Pat. App. & Inter. 1987).

2. Claims 10-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over the applied references (Lovercheck '771 in view of Negishi '633 and Marion '137) as applied to claim 4 above, and further in view of in view of Beshty et al. (4,670,359). Regarding claims 10-11, the applied references disclose the claimed invention except a mixed water-methanol tank with the molar ratio of water/methanol is controlled by utilizing water in the methanol reforming apparatus. Beshty teaches the water recovered from condenser 22 can be used as a water supply for controlling the methanol and water mixture (Fig. 2 and Col. 6, lines 28-32 and Col. 3, lines 40-45). Thus, it would have been obvious in view of Beshty to one having ordinary skill in the art

to modify the apparatus of the applied references by recovering the water from the reforming apparatus for utilization in methanol and water mixture as taught by Beshty in order to maximize energy recovery. Regarding claim 12, the applied references fail to disclose condenser recovers at least one of water generated in a fuel cell and water generated in the reforming apparatus. Beshty teaches the condensers (42) and (22) recover water from fuel cell (33) and from the reformer (23); respectively, to maximize the use of energy (Fig. 2). Thus, it would have been obvious in view of Beshty to one having ordinary skill in the art to modify the apparatus of the applied references with a condenser after the fuel cell and condenser after the reformer in order to maximize the use of energy.

Response to Arguments

Applicant's arguments with respect to claims 4 and 10-20 have been considered but are moot in view of the new ground(s) of rejection.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not


mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tom P. Duong whose telephone number is (571) 272-2794. The examiner can normally be reached on 8:00AM - 4:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn Caldarola can be reached on (571) 272-1444. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Tom Duong
August 5, 2005
TD



Glenn Caldarola
Supervisory Patent Examiner
Technology Center 1700